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(To be filled in by the candidate)

**Chemistry**

**H.S.S.C (11<sup>th</sup>)-A-2022**

Time : 20 Minutes

Paper : I

Group: II

Objective – (i)

Marks : 17

Ch-1A<sup>r</sup> Su-1-42-22 Paper Code 

6	4	8	2
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Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

**SECTION-A**

Q.1	Questions	A	B	C	D
1.	The largest number of molecules are present in:	3.6g of $H_2O$	4.8g of $C_2H_5OH$	2.8g of $CO$	5.4g of $N_2O$
2.	The number of isotopes of Tin are:	9	11	6	3
3.	The drying agent used in vacuum desiccator is:	Silica gel	$NaCl$	$AgCl$	$I_2$
4.	Solvent extraction method is a particularly useful technique for separation when the product to be separated is:	Non-volatile or thermally unstable	Volatile or thermally stable	Non-volatile or thermally stable	Volatile or thermally unstable
5.	The deviation of a gas from ideal behaviour is maximum at:	$-10^\circ C$ and $5.0 atm$	$-10^\circ C$ and $2.0 atm$	$10^\circ C$ and $2.0 atm$	$0^\circ C$ and $2.0 atm$
6.	Equal masses of methane and oxygen are mixed in an empty container at $25^\circ C$ . The fraction of total pressure exerted by oxygen is:	$\frac{1}{3}$	$\frac{8}{9}$	$\frac{1}{9}$	$\frac{16}{17}$
7.	When water freezes at $0^\circ C$ , its density decreases due to:	Cubic structure of ice	Empty spaces present in the structure of ice	Change of bond lengths	Change of bond angles
8.	Acetone and chloroform are soluble in each other due to:	Intermolecular hydrogen bonding	Instantaneous dipole	Ion dipole interaction	Dipole-dipole forces
9.	When $6d$ orbital is complete, the entering electron goes into:	$7f$	$7s$	$7p$	$7d$
10.	In the ground state of an atom, the electron is present:	In the nucleus	In the second shell	Nearest to the nucleus	Farthest from the nucleus
11.	The number of bonds in nitrogen molecule is:	One $\sigma$ and one $\pi$	One $\sigma$ and two $\pi$	Three sigma only	Two sigma and one $\pi$
12.	Which of the given species has unpaired electrons in anti-bonding molecular orbitals?	$O_2^{2+}$	$N_2^{2-}$	$B_2$	$F_2$
13.	The net heat change in a chemical reaction is same, whether it is brought about in two or more different ways in one or several steps. It is known as:	Henry's Law	Hess's Law	Joule's Principle	Law of Conservation of Energy
14.	An excess of aqueous $AgNO_3$ is added to aqueous $BaCl_2$ and precipitate is removed by filtration. What are the main ions in the filtrate?	$Ag^+$ and $NO_3^-$ only	$Ba^{2+}$ and $NO_3^-$ only	$Ag^+$ , $Ba^{2+}$ and $NO_3^-$	$Ba^{2+}$ , $NO_3^-$ and $Cl^-$
15.	18g glucose is dissolved in 90g of water. The relative lowering of vapour pressure is equal to:	$\frac{1}{5}$	5.1	$\frac{1}{51}$	6
16.	If a strip of $Cu$ metal is placed in a solution of $FeSO_4$ :	$Cu$ will be deposited	$Fe$ is precipitated out	$Cu$ and $Fe$ both dissolve	No reaction takes place
17.	The rate of reaction:	Increases as the reaction proceeds	Decreases as the reaction proceeds	Remains the same as the reaction proceeds	May decrease or increase as the reaction proceeds

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# Chemistry

H.S.S.C (11<sup>th</sup>)-A-2022

Time : 2:40 Hours

Paper : I

Group: II *Swt-C2* Subjective

Marks : 68

Note:- Section B is compulsory. Attempt any 3 questions from Section C.

## SECTION-B

2. Write short answers to any Eight parts. (8 x 2 = 16)

- i. Law of conservation of mass has to be obeyed during stoichiometric calculations. Justify.
- ii. What do you mean by molar volume? Give an example.
- iii. What is empirical formula? Give an example.
- iv. Define Solvent Extraction and Partition Law.
- v. Differentiate between stationary and mobile phase.
- vi. Define Sublimate. Give two examples.
- vii. Explain that the process of respiration obeys the Dalton's law of partial pressure.
- viii. What is Avogadro's law of gases?
- ix. Derive the value of  $R$  when the pressure is in  $Nm^{-2}$  and volume in  $m^3$ .
- x. What is the pH of a solution? Write formula to calculate pH of a solution.
- xi. Write the effect of common ion on solubility. Give an example.
- xii. Define Lowery Bronsted Concept of Acid and Base.

3. Write short answers to any Eight parts. (8 x 2 = 16)

- i. What are dipole-dipole forces? Give example.
- ii. Why ethane ( $C_2H_6$ ) has higher boiling-point than methane ( $CH_4$ ).
- iii. How fish and plants survive under ice for months in winter?
- iv. Why evaporation causes cooling?
- v. Give two properties of cathode rays.
- vi. How positive rays are produced?
- vii. What are slow and fast neutrons?
- viii. Why Rutherford's model failed?
- ix. Define Molality. Give its equation.
- x. Differentiate between ideal and non-ideal solution in two aspects.
- xi. Give two characteristics of enzyme catalysis.
- xii. Define Auto Catalyst with an example.

4. Write short answers to any Six parts. (6 x 2 = 12)

- i. Cationic radius is smaller than that of its parent atomic radius, why?
- ii. Explain geometry of  $H_2S$  molecule on the basis of VSEPR theory.
- iii. Define State and State Function.
- iv. How electronegativity changes in a group?
- v. Define Co-ordinate covalent bond with a suitable example.
- vi. Burning of a candle is a spontaneous process, justify.
- vii. What do you mean by enthalpy of neutralization? Give a suitable example.
- viii. What is the function of salt bridge?
- ix. Define Standard Electrode Potential and how it is represented?

## SECTION-C

(EACH QUESTION CARRIES EIGHT (8) MARKS)

5. (a) Write a note on limiting reactant and explain by giving two examples. (2+2)

(b) Write down postulates of Bohr's atomic model. (4)

6. (a) Describe four applications of electrolysis processes of industrial importance. (4)

(b) A gas having a volume of  $10 dm^3$  is enclosed in a vessel at  $0^\circ C$  and the pressure is 2.5 atm. This gas is allowed to expand until the new pressure is 2atm. What will be the new volume of this gas, if the temperature is maintained at 273K? (4)

7. (a) How the enthalpy of combustion is measured out by bomb calorimeter? (4)

(b) Draw out geometry of  $O_2$ ,  $N_2$  according to M.O.T. (4)

8. (a) What are liquid crystals? Give their three uses. (1+3)

(b) The solubility of  $PbF_2$  at  $25^\circ C$  is  $0.64 g dm^{-3}$ . Calculate  $K_{sp}$  of  $PbF_2$ . (4)

9. (a) Explain the three statements of Raoult's law. (4)

(b) How does Arrhenius equation help us to calculate the energy of activation of a reaction? (4)

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**Chemistry**

**H.S.S.C (11<sup>th</sup>)-A-2022**

Time : 20 Minutes

Paper : I

Group: I

Objective – (i)

Marks : 17

Ch-1A **SOL-41-22**

Paper Code

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

**SECTION-A**

Q.1	Questions	A	B	C	D
1.	27g of Al will react completely with how much mass of O <sub>2</sub> to produce Al <sub>2</sub> O <sub>3</sub> .	8g of oxygen	16g of oxygen	32g of oxygen	24g of oxygen
2.	The comparative rates at which the solutes move in paper chromatography, depends on:	The size of paper	R <sub>f</sub> Values of salutes	Temperature of the experiment	Size of the chromatographic tank used
3.	During the process of crystallization, the hot saturated solution is:	Cooled very slowly to get large sized crystals	Cooled at a moderate rate to get medium sized crystals	Evaporated to get the crystals of the product	Mixed with an immiscible liquid to get the pure crystals of the product
4.	Which of the given will have same number of molecules at STP?	280cm <sup>3</sup> of CO <sub>2</sub> and 280cm <sup>3</sup> of N <sub>2</sub> O	11.2dm <sup>3</sup> of O <sub>2</sub> and 32g of O <sub>2</sub>	44g of CO <sub>2</sub> and 4.2dm <sup>3</sup> of CO <sub>2</sub>	28g of N <sub>2</sub> and 5.6dm <sup>3</sup> of oxygen
5.	Acetone and chloroform are soluble into each other due to:	Intermolecular hydrogen bonding	Ion dipole interaction	Instantaneous dipole	All of these
6.	Quantum number values for 2p orbitals are:	n=2, l=1	n=1, l=2	n=1, l=0	n=2, l=0
7.	The type of hybridization in molecule of ethene (CH <sub>2</sub> =CH <sub>2</sub> ) is:		sp <sup>3</sup>	sp <sup>2</sup>	dsp
8.	The change in heat energy of a chemical reaction at a constant temperature and pressure is called:	Enthalpy change	Bond energy	Heat of sublimation	Internal energy
9.	For which system, does the equilibrium constant K <sub>c</sub> has units of (concentration) <sup>2</sup> ?	$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$	$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$	$2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$	$2HF_{(g)} \rightleftharpoons H_{2(g)} + F_{2(g)}$
10.	Colligative properties are the properties of:	Dilute solutions which behave as nearly ideal solutions	Concentrated solutions which behave as nearly non-ideal solutions	Both A and B	Neither A nor B
11.	The cathodic reaction in the electrolysis of dil.H <sub>2</sub> SO <sub>4</sub> with Pt electrode is:	Reduction	Oxidation	Both oxidation and reduction	Neither oxidation nor reduction
12.	The molar volume of CO <sub>2</sub> is maximum at:	STP	127°C and 1 atm	0°C and 2 atm	273°C and 2 atm
13.	Which of the given pair do not show isomorphism?	NaNO <sub>3</sub> , KNO <sub>3</sub>	ZnSO <sub>4</sub> , NiSO <sub>4</sub>	Cu, Ag	NaCl, CuCl <sub>2</sub>
14.	Which one of the given compounds possess ionic bonding?	CaO	CH <sub>4</sub>	CH <sub>3</sub> Cl	C <sub>2</sub> H <sub>6</sub>
15.	Catalyst for a catalyst is also called:	Promotor	Inhibitor	Poisoning	Retarder
16.	The mass of one mole of electrons is:	1.008 mg	0.55 mg	0.184 mg	1.673 mg
17.	Which of the given sub-atomic particle does not show ionization?	Electron	Proton	Neutron	Alpha ray

**Chemistry****H.S.S.C (11<sup>th</sup>)-A-2022**

Time : 2:40 Hours

Paper : I

Group: I **Sub - C - 2** Subjective

Marks : 68

Note:- Section B is compulsory. Attempt any 3 questions from Section C.

**SECTION-B**

2. Write short answers to any Eight parts.

(8 x 2 = 16)

- Define Relative Atomic Mass also give two examples.
- How is the law of conservation of mass obeyed during stoichiometric calculations?
- Why do the isotopes have same chemical but different physical properties?
- State Distribution Law.
- How are coloured impurities removed from crystals?
- Write two uses of chromatography.
- Prove that  $d = \frac{PM}{RT}$
- Calculate the value of  $R$  in SI units.
- Give two applications of plasma.
- What are buffers?
- What is the effect of common ion on solubility?
- How  $K_c$  determines the direction of chemical reaction?

3. Write short answers to any Eight parts.

(8 x 2 = 16)

- Evaporation takes place at all temperatures. Give reason.
- Iodine dissolves readily in tetrachloromethane. Give reason.
- Define Transition Temperature. Give an example.
- The electrical conductivity of the metals decreases by increasing temperature. Why?
- Why is  $\frac{e}{m}$  value of cathode rays just equal to that of electron?
- State Aufbau Principle.
- State Heisenberg's uncertainty principle. Give its mathematical form.
- Cathode rays are material particles. Justify it.
- The sum of mole fractions of all the components is always equal to unity for any solution. Justify it.
- What are conjugate solutions? Give an example.
- What is rate determining step? Give an example.
- Write two characteristics of enzyme catalysis.

4. Write short answers to any Six parts.

(6 x 2 = 12)

- Why Helium can not exist as diatomic molecule?
- Draw out Lewis structures of (i)  $BF_3$  (ii)  $CH_4$
- The distinction between co-ordinate covalent bond and a covalent bond vanishes after bond formation in  $NH_4^+$ , explain.
- Why the dipole moment of  $CO_2$  is zero?
- Define Standard Enthalpy of Formation with an example.
- Is it true, non-spontaneous process never happens in universe?
- Why burning of candle is spontaneous process?
- Find out oxidation state of  $Mn$  in  $KMnO_4$ .
- Why a salt bridge maintains electrical neutrality in the cell?

**SECTION-C****(EACH QUESTION CARRIES EIGHT (8) MARKS)**

- (a) What is yield? Write its types. How will you calculate the percentage yield? (1+1+2)  
(b) What are quantum numbers? Give importance of azimuthal quantum number. (1+3)
- (a) A gas having a volume of  $10 \text{ dm}^3$  is enclosed in a vessel at  $0^\circ\text{C}$  and the pressure is 2.5 atm. This gas is allowed to expand until the new pressure is 2 atm. What will be the new volume of this gas, if the temperature is maintained at 273K? (4)  
(b) Write down four applications of electrochemical series. (4)
- (a) Define hybridization and explain  $sp^2$  hybridization by giving the example of ethene ( $CH_2 = CH_2$ ) (1+2+1)  
(b) How the enthalpy of a reaction can be measured by using bomb calorimeter. (4)
- (a) What is hydrogen bonding? Explain H-Bonding in biological compounds. (1+3)  
(b) The solubility of  $CaF_2$  in water at  $25^\circ\text{C}$  is found to be  $2.05 \times 10^{-4}$  mole  $\text{dm}^{-3}$ . What is the value of  $K_{sp}$  at this temperature? (4)
- (a) What is Raoult's law? Explain it by three ways. (4)  
(b) Define Order of Reaction. Give examples of some reactions explaining the order of reaction. (4)